IF YOU ARE SEEING THIS PAGE, PLEASE NOTE:

As of June 2010, all permits having a fact sheet that are going through a modification will have posted in pdf format the modification fact sheet attached to the front of the previous renewal fact sheet.

FACT SHEETS ARE ON NEXT PAGE

If you have any questions regarding this, please contact the NPDES or PPU sections in the Division of Surface Water.

Attached are:

3PE00008 *MD & KD

National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T   S H E E T

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the **Warren Water Pollution Control Center**

Public Notice No.: 10-09-071
Public Notice Date: September 29, 2010
Comment Period Ends: October 29, 2010

OEPA Permit No.: **3PE00008*MD**
Application No.: **OH0027987**

Name and Address of Applicant:

City of Warren
2323 Main Ave. S.W.
Warren, Ohio 44481

Name and Address of Facility Where Discharge Occurs:

Warren WPCC
2323 Main Ave.
Warren, Ohio 44481
Trumbull County

Receiving Water: **Mahoning River**

Subsequent Stream Network: **Beaver River to Ohio River**

Introduction

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations, Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency, as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act and Ohio Water Pollution Control Law (ORC 6111). Decisions to award variances to Water Quality Standards or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by U.S. EPA in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

Summary of Permit Conditions

This permit modification would change monitoring requirements for the WPCC in response to the introduction of "low salinity" wastewater from Marcellus Shale hydrofracturing. The proposed inputs to the WPCC are 100,000 gallons per day (0.1 million gallons per day) at concentrations of total dissolved solids less than or equal to 50,000 mg/l. Additions to the WPCC at this magnitude will not cause significant degradation to the Mahoning River. As a result, Ohio EPA is requiring only monitoring for total dissolved solids, sulfate and chloride. The monitoring frequency for TDS would increase to daily to track any significant variation in effluent concentrations due to the new salty inputs. Sulfate, chloride, barium and strontium are new parameters in the permit; these have been added to measure the specific materials that make up TDS.

Ohio EPA is also proposing to increase the effluent toxicity monitoring requirement from 1/year to 1/quarter to check the effect of TDS discharges on aquatic life.

Procedures for Participation in the Formulation of Final Determinations

The proposed modification is tentative but shall become final on the effective date unless (1) an adjudication hearing is requested, (2) the Director withdraws and revises the proposed modification after consideration of the record of a public meeting or written comments, or (3) upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty (30) days of publication of this notice, any person may submit written comments, a statement as to why the proposed modification should be changed, a request for a public meeting on the proposed modification and/or a request for notice of further actions concerning the modification. All communications timely received will be considered in the final formulation of the modification. If significant public interest is shown a public meeting will be held prior to finalization of the modification.

Within thirty (30) days of the issuance of the proposed modification notice any officer of an agency of the state or of a political subdivision, acting in his representative capacity or any person aggrieved or adversely affected by issuance of it may request an adjudication hearing by submitting a written objection in accordance with Ohio Revised Code Section 3745.07. Since all other conditions of the permit remain in effect, a hearing may not be requested on any issues other than the proposed modification. If an adjudication hearing is requested, the existing NPDES permit will remain in effect until the hearing is resolved. Following the finalization of the modification by the Director, any person who was a party to an adjudication hearing may appeal to the Environmental Review Appeals Commission.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

Legal Records Section
Ohio Environmental Protection Agency
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the proposed modification. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits and Compliance Section
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43216-1049

The OEPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the proposed modification, contact Erm Gomes at (330) 963-1196 (email: erm.gomes@epa.ohio.gov) or Eric Nygaard at (614) 644-2024 (email: eric.nygaard@epa.ohio.gov)

Location of Discharge/Receiving Water Use Classification
The Warren WPCC discharges to the Mahoning River at River Mile 35.25. The approximate location of the facility is shown in Figure 1.

The Mahoning River, which flows into the Beaver River in Pennsylvania, has the following designated uses: Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation. This section of the Mahoning River is identified by Ohio EPA River Code:18-001, and USEPA River Reach number 05030101-007.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric water quality standards are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural and industrial water supply.

Facility Description

The Warren WPCC has a 16.0 MGD design flow and was last upgraded to advanced secondary treatment in February 1988. Treatment processes include grit removal, detritus setting tanks, extended aeration activated sludge, primary and final settling tanks, chlorination, and post aeration with the discharge to the mainstem at river mile (RM) 35.25. The sewage system is considered separate, but has had a history of problems with sanitary sewer overflows (SSOs) due to excessive inflow/infiltration (I/I).

Ten significant industrial users contribute approximately 3.4 MGD of flow to the treatment works. Eight of these industrial users are categorical industries (subject to U.S. EPA treatment technology regulations). The City of Warren has an approved pretreatment program to regulate these discharges.

Receiving Water Quality / Environmental Hazard Assessment

No recent biological and chemical data exist for this segment of the Mahoning River. Historical data (from 1994) show that this river segment did not meet the designated warmwater habitat aquatic life use. Ohio EPA believes that this non-attainment continues to exist, based on limited biological sampling from 2002 and 2003, along with historical chemical data on stream sediments and recent fish tissue chemistry.

The summary sheet from Ohio's 2006 Integrated Water Quality Monitoring and Assessment Report is attached to this fact sheet. The complete Integrated Report can be found on the Agency website at: http://www.epa.state.oh.us/dsw/tmdl/2006IntReport/2006OhioIntegratedReport.html.

Basis for Modification/Effluent Limits and Permit Conditions

The City of Warren is requesting authorization to accept pretreated wastewater generated during oil and gas well drilling, development, and production. The wastewater would be discharged from regulated centralized waste treatment (CWT) facilities which are tributary to the Warren WPCC. These wastewaters typically contain high levels of Total Dissolved Solids (TDS), and include pollutants such as chlorides, sulfates and barium. While some incidental removal will occur, municipal wastewater treatment plants are not typically designed to treat for TDS. Rather, these facilities rely on their dilution capacity to manage wastes with elevated TDS concentrations. Hence, these pollutants, if not properly controlled, can diminish or inhibit biological treatment processes, pass through the treatment plant, increase effluent toxicity, and cause water quality issues in receiving streams.

Currently, there is limited information on the TDS concentrations in all Mahoning River dischargers. In order to better evaluate the potential impacts on the Warren WPCC and the Mahoning River, the facility conducted an eight week pilot study. Gas well wastewater was introduced, at a controlled rate, into the headworks and pollutants of concern were monitored at defined influent, effluent, biosolids, and upstream and downstream sampling locations. The test was limited to wastewater characterized as "low salinity", i.e. wastewater with a TDS concentration equal to or less than 50,000 mg/l, and the maximum amount introduced into the facility was 100,000 gallons/day. Data was collected during the test on parameters that included TDS, chlorides, barium, strontium, and whole effluent toxicity. Additionally, data was collected for certain radiological parameters.

The results of the pilot study did not show any negative impacts on the treatment plant operations, sludge quality, or effluent toxicity.

Calculations indicate that instream TDS concentrations should increase by approximately 60 mg/l under low flow conditions (i.e. 7Q10). This projected increase should not result in any biological impact to the Mahoning River. Also, it should not impact the public water supply for Beaver Falls, PA, which is located on the Beaver River. Therefore, Ohio EPA is proposing NPDES permit modifications based on a maximum discharge of 100,000 gpd at 50,000 mg/l from gas well wastewater treatment facilities. At these input rates, the WPCC will not have the reasonable potential to contribute to an exceedance of WQS in the Mahoning River.

To track the progress of these discharges Ohio EPA has added daily effluent monitoring requirements for total dissolved solids. The Agency has also added monitoring requirements for the more important constituent parts of dissolved solids, chloride and sulfate, as well as parameters that are elevated in many ground waters (barium and strontium). Ohio EPA is also proposing to increase the frequency of toxicity monitoring from 1/year to 1/quarter. These additional monitoring requirements assist with assessing potential problems associated with TDS discharges.

Ohio EPA has also added a compliance schedule item that requires Warren to submit an annual report on wastewaters received from these dischargers. This condition also requires the City to stop accepting wastewater if these wastewaters cause inhibition of the plant's biological treatment process, cause water quality impacts downstream of the facility, or adversely affect the quality of the plant's biosolids. These requirements provide an additional check on the inputs of pollutants in this wastewater and action items to minimize environmental impact.

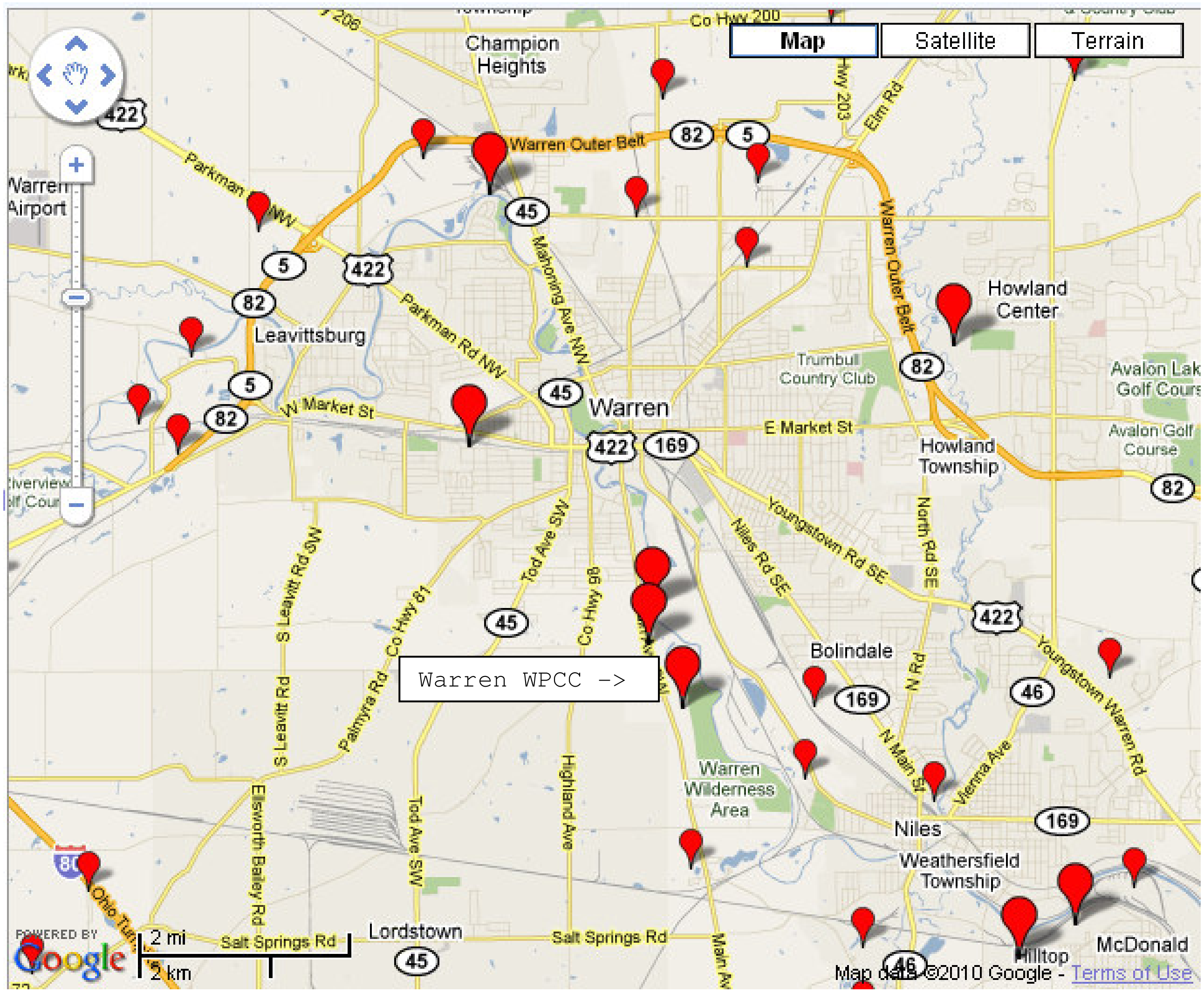


Figure 1. Location of Warren WPCC. Balloons indicate NPDES permittees; the larger balloons show major permittees.

Table 1. Final effluent limits and monitoring requirements for Warren WPCC outfall 3PE00008001 and the basis for their recommendation.

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Flow	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Temperature	^oC	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/l	--	5.0 min.	--	--	WQS/PD
COD	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
$CBOD_5$	mg/l	12	18[d]	727	1090[d]	EP/PD
Suspended Solids	mg/l	20	30[d]	1211	1817[d]	EP/PD
Ammonia-N	mg/l					
Summer		3.0	4.5[d]	182	273[d]	WLA/EP/PD
Winter		15	22[d]	908	1332[d]	WLA/EP/PD
Nitrate/Nitrite-N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Kjeldahl-N, T.	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Phosphorus	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Dissolved Solids	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Oil and Grease	mg/l	--	10	--	--	WQS
pH	S.U.	- - - - - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - -				WQS
Fecal coliform	#/100ml					
Summer		1000	2000[d]	--	--	WQS
Chlorine Residual	mg/l	--	0.028	--	--	ABS/EP
Cyanide, Free	mg/l	0.024	0.086	1.45	5.21	WLA
Chloride	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Sulfate	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Barium	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Cadmium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Chromium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Hex. Chromium (Dissolved)	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Copper, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Lead, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Mercury, T.	ng/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Nickel, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Selenium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Strontium	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Zinc, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Whole Effluent Toxicity						
Acute	TUa	- - - - - - - - Monitor (w/o trigger) - - - - - - - - - -				FAR, BPJ
Chronic	TUc	- - - - - - - - Monitor (w/o trigger) - - - - - - - - - -				FAR, BPJ

Table 1. Con't.

[a] Effluent loadings based on average design discharge flow of 16 MGD.

[b] <u>Definitions:</u> ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l)); EP = Existing Permit; FAR = Federal Application Requirement under 40 CFR 122.21(j); M = Monitoring; PD = Plant Design Criteria; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ; WLA = Wasteload Allocation procedures (OAC 3745-2); WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum; WQS = Ohio Water Quality Standards (OAC 3745-1).

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

[d] 7 day average limit.

National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T   S H E E T

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the **Warren Water Pollution Control Center**

Public Notice No.: 08-03-006	OEPA Permit No.: **3PE00008*KD**
Public Notice Date: March 4, 2008	Application No.: **OH0027987**
Comment Period Ends: May 4, 2008	

Name and Address of Applicant:	Name and Address of Facility Where Discharge Occurs:
City of Warren **2323 Main Ave. S.W.** **Warren, Ohio 44481**	**Warren WPCC** **2323 Main Ave.** **Warren, Ohio 44481** **Trumbull County**
Receiving Water: **Mahoning River**	Subsequent Stream Network: **Beaver River to Ohio River**

Introduction

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations, Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency, as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act and Ohio Water Pollution Control Law (ORC 6111). Decisions to award variances to Water Quality Standards or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the Clean Water Act. Many of these have already been established by U.S. EPA in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

Summary of Permit Conditions

The draft limits and monitoring requirements for the Warren WPCC are very similar to the conditions in the current permit. Most effluent limits from the current permit would be carried over into the new permit.

Limits for selenium, and limits and monitoring for thallium, would be removed from the permit. Effluent data shows that these parameters no longer have the reasonable potential to contribute to exceedances of water quality standards.

New limits are included for free cyanide. The effluent data shows that cyanide discharges have the reasonable potential to exceed WQS. The permit contains a compliance schedule to allow the City to meet this new limit.

Table of Contents

List of Figures

List of Tables

List of Tables - continued

Procedures for Participation in the Formulation of Final Determinations

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

Legal Records Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Water Resource Management Section
P.O. Box 1049
Columbus, Ohio 43216-1049

The OEPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

Location of Discharge/Receiving Water Use Classification

The Warren WPCC discharges to the Mahoning River at River Mile 35.25. The approximate location of the facility is shown in Figure 1.

The Mahoning River, which flows into the Beaver River in Pennsylvania, has the following designated uses: Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation. This section of the Mahoning River is identified by Ohio EPA River Code:18-001, and USEPA River Reach number 05030101-007.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric water quality standards are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact) and wading only (Secondary Contact - generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural and industrial water supply.

The Lower Mahoning River study area is shown in Figure 2.

Facility Description

The Warren WPCC has a 16.0 MGD design flow and was last upgraded to advanced secondary treatment in February 1988. Treatment processes include grit removal, detritus setting tanks, extended aeration activated sludge, primary and final settling tanks, chlorination, and post aeration with the discharge to the mainstem at river mile (RM) 35.25. The sewage system is considered separate, but has had a history of problems with sanitary sewer overflows (SSOs) due to excessive inflow/infiltration (I/I).

Ten significant industrial users contribute approximately 3.4 MGD of flow to the treatment works. Eight of these industrial users are categorical industries (subject to U.S. EPA treatment technology regulations). The City of Warren has an approved pretreatment program to regulate these discharges.

Description of Existing Discharge

There is one outfall which is outfall 001.

Table 3 presents a summary of analytical results for outfall 001 effluent samples compiled from the annual pretreatment reports submitted by the City of Warren. The monthly average PEQ_{avg} and daily maximum PEQ_{max} decision criteria are also included on this table.

Table 4 presents a summary of unaltered monthly operation report data for the period January 1996 to June 2001 for the City of Warren as well as current permit limits, and monthly average PEQ_{avg} and daily maximum PEQ_{max} values.

Receiving Water Quality / Environmental Hazard Assessment

No current biological and chemical data exist to evaluate this discharge. Historical data (from 1994) show that this river segment did not meet the designated warmwater habitat aquatic life use. Ohio EPA believes that this non-attainment continues to exist, based on limited biological sampling from 2002 and 2003, along with historical chemical data on stream sediments and recent fish tissue chemistry.

The summary sheet from Ohio's 2006 Integrated Water Quality Monitoring and Assessment Report is attached to this fact sheet. The complete Integrated Report can be found on the Agency website at: http://www.epa.state.oh.us/dsw/tmdl/2006IntReport/2006OhioIntegratedReport.html.

Development of Water Quality-Based Limits

Determining appropriate effluent concentrations is a multiple step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits. In addition, antidegradation and whole effluent toxicity issues must be addressed.

As in past modeling studies, all facilities discharging to the Mahoning River mainstem between the Leavittsburg dam and the Ohio-Pennsylvania boundary are considered interactive and are included in the wasteload allocation (WLA). The WLA contains a total of 24 outfalls from 7 municipal WPCCs and 7 industrial facilities, as follows:

Warren Steel Holdings (CSC Industries)	Thomas Steel Strip
Warren Consolidated Industries	ISG (Mittal) Steel
Warren WPCC	Reactive Metals Inc.
Orion Power Midwest, Niles Plant	Niles WPCC
McDonald Steel	Girard WPCC
Youngstown WPCC	Campbell WPCC
Struthers WPCC	Lowellville WPCC

Three dischargers located on tributaries are allocated separately from the mainstem discharges: Meander Creek WPCC (Meander Creek), Mosquito Creek WPCC (Mosquito Creek), and Boardman WPCC (Mill Creek). Travel time to and distance from the Mahoning River are considered large enough that, for modeling purposes, the effluents from the respective treatment plants are considered non-interactive with the direct dischargers to the Mahoning. Effluents from these three treatment plants were allocated to meet water quality standards for the conditions, habitat, and use designation for their particular receiving waters and separate Permit Support Documents were prepared for each facility. Monitoring was conducted at the mouths of these tributaries, however, for inputs into the Mahoning River mainstem model.

Parameter Selection

Effluent data for the Warren WPCC were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data (SWIMS)	January 2002 through December 2006
Pretreatment program	2003 through 2005

The effluent data were checked for outliers and the no values were eliminated from the data set. The average and maximum projected effluent quality (PEQ) values are presented in Table 5. For a summary of the screening results, refer to the parameter groupings at the end of this section.

Water Quality Standards

Ohio water quality standards (WQS) were used for all parameters except for chronic cadmium and chronic lead. The Mahoning River enters Pennsylvania at about river mile (RM) 11.43, and Pennsylvania WQS must be met at that point. Allocations for chronic cadmium and chronic lead were conducted to ensure that Pennsylvania WQS are met at the state line. The Pennsylvania Aquatic Life criteria and Human Health criteria were met at the state line for all other parameters (metals and organics).

Flows in the Mahoning River

Flows in the Mahoning River are contributed by a series of reservoirs in the headwaters and on Mosquito Creek, controlled and mostly owned by the U.S. Army Corps of Engineers. Constructed several decades ago to provide adequate flow for the steel industry of the Mahoning River valley, the reservoirs are operated on a schedule to maintain specific seasonal flows at Leavittsburg and Youngstown. The operation of the reservoir system is discussed at length in earlier USEPA Mahoning River studies (Amendola et al., 1977; Schregardus and Amendola, 1984).

Modeling Approach and Wasteload Allocations

Appropriate effluent concentrations for dischargers to the Mahoning River were determined using two models: a Monte Carlo model for the six commonly allocated metals (cadmium, chromium (total), copper, lead, nickel, and zinc) and the conventional Ohio EPA conservative parameter model (CONSWLA) for all other parameters. The models and their applications are discussed in the sections that follow and model inputs are presented.

Allocations are developed using a percentage of stream design flow (as specified in Table 7), and allocations cannot exceed the Inside Mixing Zone Maximum criteria. The data used in the WLAs are listed in Tables 6 and 7. The wasteload allocation results to maintain all applicable criteria are presented in Table 8. The current permit limits for NH_3-N were evaluated and found to be adequate to maintain the instream WQS for NH_3-N. Therefore, NH_3-N will not be addressed further in this report.

Dissolved Metals Translators
A dissolved metals translator (DMT) is the factor used to convert a dissolved metal aquatic life criterion to an effective total recoverable aquatic life criterion with which a total recoverable aquatic life allocation can be calculated as required in the NPDES permit process. Currently, a DMT is based on site- or area-specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement. For Mahoning River, there were 5 such paired samples available applicable to copper, lead, and silver. To account for the limited quantity of data, the DMT for each of these metals was determined as the lower end of the 95% confidence interval (1-tail) about the geometric mean of the total recoverable-to-dissolved ratios of the sample pairs. A DMT for zinc, cadmium, chromium, and nickel could not be determined due to shortcomings in the data. Each DMT is metal-specific and is applied by multiplying the dissolved criteria by the DMT, resulting in total effective recoverable criteria which can be used in the wasteload allocation procedures.

The Monte Carlo Model
The application of the Monte Carlo method was limited to the six commonly allocated metals (cadmium, chromium (total), copper, lead, nickel, and zinc). Previous allocations, using the conventional Ohio EPA conservative parameter model, resulted in stringent limits for these parameters that have been difficult for dischargers to maintain. As a result, the Ohio EPA was asked to consider other methods for determining effluent limits that would adequately protect the river while allowing the dischargers some relief. The Monte Carlo method addresses these concerns but does not guarantee more favorable discharge limits. This is the third permit cycle where a Monte Carlo method was used to determine the wasteload allocations for the six metals listed above.

Conventional water quality modeling methods project the receiving water pollutant concentration which will occur under critical low-flow conditions. The Monte Carlo probabilistic method, as applied to water quality modeling, projects the year-round probability distribution for the pollutant. This allows a more accurate determination of the frequency at which water quality criteria are violated or maintained. Conventional modeling methods, when applied to systems with numerous dischargers, may be overly conservative because they model all dischargers at their maximum permitted concentration. The more dischargers modeled, the more unlikely it is that all will discharge at their maximum level at the same time and at critical low-flow conditions. The Monte Carlo method accounts for the independent variability of discharges as well as other model inputs.

The Monte Carlo model for the Mahoning River was originally developed by Limno-Tech, Inc., for their 1993 study to determine alternative copper limits for Thomas Strip Steel. The model combines the Monte Carlo statistical method with a multi-discharge mass-balance model and allows upstream flow to be input from a historical gaging station flow record, in order to to account for unusual flow fluctuations caused by the numerous upstream dams and reservoirs. Ohio EPA approved the alternative limits developed using this model and received permission to modify and apply the model in the future. The original model was written in 1992-1993 in Borland Pascal. For this permit cycle, the model has been modified by the Ohio EPA and re-written in the ‘C’ programming language.

River Hardness and Water Quality Criteria
Water quality criteria for the six metals depends on instream hardness. Thus, hardness is a key element in determining effluent limits. A detailed analysis of the available hardness and flow data was conducted. This analysis revises and updates the Ohio EPA analysis previously performed in 2002. Stream hardness data was taken from the two main STORET stations on the Mahoning River main stem, at Leavittsburg, Ohio (RM 45.51) and at Lowellville, Ohio (RM 12.42). The hardness data for the two stations was analyzed for the period January 1997 to October 2006.

A linear correlation between the Leavittsburg USGS gaging station flow and instream hardness was determined for both STORET stations. These correlations were then used to calculate hardness as a function of river mile at 127 cfs (Leavittsburg 1Q10 low flow) and 135 cfs (7Q10 low flow).

<u>Acute Criteria, at 1Q10</u>

river hardness (mg/L) = (-0.575)(river mile) + 184.534

<u>Chronic Criteria, at 7Q10</u>

river hardness (mg/L) = (-0.575)(river mile) + 184.291

Discharger hardness was calculated with these equations. This relationship established local river hardness for calculating outside-mixing-zone, hardness-dependent criteria in the Monte Carlo model. Inside-mixing-zone, maximum criteria were determined with effluent hardness data when available, or outside-mixing-zone hardness when effluent data was unavailable.

Table 1 contains the water quality criteria for the six metals in the vicinity of the Warren WPCC.

This Monte Carlo method uses a thirty-day averaging period with a ten-year return period for meeting chronic (average) water quality criteria. A one-day averaging period with a ten-year return period is used for meeting the acute (maximum) water quality criteria. Since the chronic aquatic life criteria are less than or approximate to both the agriculture and human health criteria and since the return periods for both agriculture and human health criteria would be longer than ten years, the allocations that meet the average aquatic life criteria will be protective of the agriculture and human health criteria as well.

Federal rules require that a downstream state's water quality criteria be considered when calculating effluent limits. The Pennsylvania state line is at RM 11.43. Pennsylvania's standards are the same as Ohio's for copper, total chromium, nickel, and zinc. However, Pennsylvania's standards for cadmium and lead are more stringent than Ohio's and had to be considered. Since Pennsylvania uses, in effect, a one hundred-day return period, Ohio's acute criteria for those two metals, in combination with a ten-year return period, still meet Pennsylvania's water quality criteria. However, the same is not true for the chronic criteria.

Table 1. Water Quality Criteria for Monte Carlo Model Parameters (Warren WPCC)

		Outside Mixing Zone Criteria				Inside Mixing Zone
		Average			Maximum	
Parameter (µg/L)	Health	Human culture[A]	Agri- Life[B]	Aquatic Life[B]	Aquatic Maximum[C]	
Cadmium		-	50.	0.41[E]	7.9	19.
Chromium, total		-	100.	130.	2700.	6100.
Copper		1300.	500.	15.[D]	24.[D]	51.
Lead		-	100.	6.1[D,E]	240.[D]	550.
Nickel		610.[E]	200.	79.	710.	1600.
Zinc		69000.	25000.	180.	180.	410.

[A] There is some uncertainty regarding the return period used to develop the Agricultural Water Supply (AWS) criteria. Therefore, the AWS criteria for the Monte Carlo model are presented for information purposes only.
[B] Based on river hardness of 164 mg/L.
[C] Based on effluent hardness of 189 mg/L.
[D] Effective Criteria Based on Application of Dissolved Metal Translator.
[E] Pennsylvania WQC at the state line.

Data Analysis for the Monte Carlo Model

The Monte Carlo method accounts for individual system component variability by generating probability distributions that predict a range of possible input conditions. These distributions are derived from the mean and the coefficient of variation input by the user and based on field data for each of these components. Table 2 lists the calculated mean and coefficient of variation for such system characteristics as background/ambient concentrations and discharger and tributary flows.

Table 2. Monte Carlo Model Inputs

Parameter	Mean	Coefficient of Variation Acute	Coefficient of Variation Chronic	Source
Mahoning River at Leavittsburg				
Flow (MGD)[A]	--	--	--	USGS
Cadmium (µg/L)	0.0	0.0	0.0	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	0.0	0.0	0.0	STORET
Lead (µg/L)	1.242	0.739	0.135	STORET
Nickel (µg/L)	0.0	0.0	0.0	STORET
Zinc (µg/L)	8.966	0.507	0.093	STORET
Mosquito Creek at mouth				
Flow (MGD)	80.65	1.44	0.263	USGS/SWIMS
Cadmium (µg/L)	0.0	0.0	0.0	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	1.916	0.326	0.060	STORET
Lead (µg/L)	3.7	0.383	0.070	STORET
Nickel (µg/L)	0.0	0.0	0.0	STORET
Zinc (µg/L)	18.45	0.607	0.111	STORET
Meander Creek at mouth				
Flow (MGD)	3.706	0.330	0.060	SWIMS
Cadmium (µg/L)	0.0	0.0	0.0	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	2.614	0.895	0.163	STORET
Lead (µg/L)	1.509	1.192	0.218	STORET
Nickel (µg/L)	0.0	0.0	0.0	STORET
Zinc (µg/L)	28.394	0.468	0.085	STORET
Little Squaw Creek at mouth				
Flow (MGD)	2.808	0.537	0.098	SWIMS
Cadmium (µg/L)	0.095	2.425	0.443	SWIMS
Chromium, total (µg/L)	2.722	1.229	0.224	SWIMS
Copper (µg/L)	7.603	1.155	0.211	SWIMS
Lead (µg/L)	0.0	0.0	0.0	SWIMS
Nickel (µg/L)	2.644	2.621	0.479	SWIMS
Zinc (µg/L)	70.56	0.949	0.173	SWIMS

Table 2. Monte Carlo Model Inputs (continued)

Parameter	Mean	Coefficient of Variation Acute	Coefficient of Variation Chronic	Source
Mill Creek at mouth				
Flow (MGD)	44.52	2.23	0.407	USGS
Cadmium (µg/L)	0.12	0.48	0.088	STORET
Chromium, total (µg/L)	0.0	0.0	0.0	STORET
Copper (µg/L)	2.37	0.70	0.127	STORET
Lead (µg/L)	4.12	1.95	0.356	STORET
Nickel (µg/L)	28.1	0.30	0.055	STORET
Zinc (µg/L)	13.5	1.87	0.34	STORET
Discharger flows (MGD)				
Warren Steel Holdings (CSC)	0.657	0.905	0.165	SWIMS
Thomas Steel Strip	1.11	0.336	0.061	SWIMS
Warren Consolidated Industries				
003	0.094	0.528	0.096	SWIMS
006	0.002	0.340	0.062	SWIMS
007	2.48[C]	0.314	0.057	SWIMS
008	6.50	0.179	0.033	SWIMS
Intake[B]	--.--	--.--	--.--	---
013	38.25	0.188	0.034	SWIMS
010	0.442	0.473	0.086	SWIMS
011	0.601	0.346	0.063	SWIMS
012	0.158	0.184	0.034	SWIMS
Mittal 014	3.512	0.359	0.066	SWIMS
Warren WPCC 14.28	0.440	0.080	SWIMS	
Reactive Metals Inc.	0.374	0.408	0.075	SWIMS
Orion Power				
002	3.437	0.300	0.055	SWIMS
008	0.001	0.0	0.0	SWIMS
Niles WPCC	5.512	0.558	0.102	SWIMS
McDonald Steel	0.725	0.310	0.057	SWIMS
Youngstown WPCC	37.25	0.313	0.057	SWIMS
Campbell WPCC	1.624	0.515	0.094	SWIMS
Struthers WPCC	4.643	0.306	0.056	SWIMS
Lowellville WPCC	0.358	0.666	0.122	SWIMS

[A] Each iteration of the model sequentially selects an upstream flow from the historical flow record at this gage.
[B] Intake flow was set equal to the sum of the WCI effluent flows plus the Mittal flow, multiplied by 0.871. (12.9% of the WCI / Mittal flow comes from sources other than the intake.)
[C] Recommended by Erm Gomes; outfall is submerged and no recent flows are available

The Conservative Substance Wasteload Allocation Model (CONSWLA)

The Conservative Substance Wasteload Allocation Model (CONSWLA) was used to allocate all parameters not included in the Monte Carlo model. CONSWLA is the model Ohio EPA typically uses in multiple discharger situations. Contrary to the Monte Carlo model, described above, CONSWLA model inputs for flow are fixed at their critical low levels and inputs for effluent flow are fixed at their design or 50th percentile levels. Background concentrations are fixed at a representative value (generally a 50th percentile). A mass balancing method is then used to allocate effluent concentrations that maintain WQS under these conditions. This technique is appropriate when data bases are unavailable to generate statistical distributions for inputs (like those used in the Monte Carlo method) and if the parameters modeled are conservative.

Reasonable Potential
After appropriate effluent limits are calculated (using the Monte Carlo and CONSWLA models), the reasonable potential of the discharger to violate the WLA (and the WQS) must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the most restrictive average WLA and the maximum WLA were selected from Table 8. The average PEQ value (Table 5) is compared to the average PEL, and the maximum PEQ value is compared to the maximum PEL. Based on the calculated percentage of the respective average and maximum comparisons, the parameters are assigned to “groups”, as listed in Table 9.

Whole Effluent Toxicity WLA
Whole effluent toxicity or “WET” is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

Water Quality Standards for WET are expressed in Ohio’s narrative “free from” WQS rule (OAC 3745-1-04(D)). These “free froms” are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). Wasteload allocations can then be calculated using TUs as if they were water quality criteria.

The wasteload allocation calculations for WET are similar to those for aquatic life criteria (using the chronic toxicity unit (TU_c) and 7Q10 for average and the acute toxicity unit (TU_a) and 1Q10 for maximum). An assessment of the biological and hydraulic data in the vicinity of the Warren WPCC indicated that the effluent acute toxicity is interactive with ISG Mittal Steel and the Warren Consolidated Industries discharges. For the Warren WPCC, the AET values are 0.48 TU_a and 7.01 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the IC_{25}:

$$TU_c = \frac{100}{IC_{25}}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (Ceriodaphnia dubia only):

$$TUc = \frac{100}{\text{geometric mean of NOEC and LOEC}}$$

The acute toxicity unit (TU_a) is defined as 100 divided by the LC50 for the most sensitive test species:

$$TU_a = \underline{100}$$

LC50

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

When the calculated wasteload allocation is less than 1.0 TU_a, the wasteload allocation is defined as:

Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

The WLA is 40% mortality in 100% effluent based on the dilution ratio of 2.4 to 1 (based on discharges from the three permittees used in the WET allocation.

Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WLA (and the WQS) must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the Preliminary Effluent Limit (PEL) for the most restrictive average and maximum WLA were selected from Table 9. The PEL_{avg} was compared to the PEQ_{avg} value from Table 5, and the PEL_{max} was compared to the PEQ_{max} value. Based on the calculated percentage of the allocated value, the parameters are assigned to group 3, 4 or 5. The listing in Table 9 (Parameter Assessment Table) reflects the hazard assessment done according to WLA procedures. Table 10 (Final Effluent Limits Table) shows the draft NPDES limits for the City of Warren.

Limits proposed for oil and grease, pH, fecal coliform, and dissolved oxygen are based on Water Quality Standards (OAC 3745-1).

Proposed limits for total suspended solids (TSS), ammonia-nitrogen (NH_3-N), 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), and dissolved oxygen (D.O.) are all based on plant design.

The Ohio EPA risk assessment (Table 10) places free cyanide in group 5. This placement as well as the data in Tables 3, 4, and 5 indicate that the reasonable potential to exceed water quality standards exists and limits are necessary to protect water quality. The thirty day average limit and the daily maximum limits are based on Wasteload Allocation (WLA).

The limit for residual chlorine would be continued in the new permit because it is one of the basic operating parameters for the plant. The draft limit is based on the current permit limit because it is slightly more restrictive than the new wasteload allocation. State and federal antibacksliding rules require the use of the current limit in this situation [see OAC 3745-33-05(E) and 40 CFR 122.45].

Ohio EPA risk assessment (Table 9) places cadmium, mercury and selenium in group 4. This placement as well as the data in Tables 3, 4, and 5 support that these parameters should not pose an environmental hazard and limits are not necessary to protect water quality. Monitoring is proposed to document that these pollutants continue to remain at low levels.

For mercury, the permit contains an additional requirement for the next permit application. This condition requires the City to assess compliance with the monthly average water quality standard, and to submit a mercury variance request with the application if this concentration can not be achieved (see Part II, Item _).

Ohio EPA risk assessment (Table 10) places chromium, hexavalent chromium, copper, lead, nickel, nitrate/nitrite and zinc in groups 2/3. This placement as well as the data in Tables 3, 4 and 5 support that these parameters should not pose an environmental hazard and limits are not necessary to protect water quality. Monitoring at a reduced frequency is proposed to document that these pollutants continue to remain at low levels.

Additional monitoring requirements proposed at the final effluent, influent, upstream/downstream and sludge stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies

The Ohio 305 (b) Report indicates that nutrients are one of the causes of impairment to the Mahoning River so the following nutrients will be monitored: Phosphorus, Total Kjeldahl Nitrogen, and Nitrate+Nitrite-N.

The permit also contains a compliance schedule item to investigate and fix sources of excessive I/I in the sewer system. This condition is needed to prevent SSOs in the sewer network.

Whole Effluent Toxicity Reasonable Potential

WET values are compared to wasteload allocation values. This comparison along with an assessment of the instream community are two ways in which whole effluent toxicity is evaluated. For the Warren WPCC, the WLA values are 0.48 TU_a and 7.01 TU_c.

The Warren WPCC does not have the reasonable potential to exceed narrative water quality standards for toxicity. None of the four available test results showed acute or chronic toxicity to test organisms (see Table 4 for results).

The draft permit contains an annual chronic toxicity test requirements, with acute endpoints reported. U.S. EPA has informed Ohio EPA that state application requirements for publicly owned treatment works do not conform to federal rules because they do not require the submission of at least four toxicity tests. To address this requirement, Ohio EPA has begun to include annual testing in permits for major POTWs. Chronic tests are being included for Warren WPCC because the chronic WLA of 7.01 is less than the maximum acute chronic ratio usually seen in toxicity testing (20:1).

Table 3. Effluent Characterization and Decision Criteria

Summary of analytical results for Warren WPCC outfall 3PE00008001. All values are in µg/l unless otherwise indicated. PT = data from, pretreatment program reports; OEPA = data from analyses by Ohio EPA; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

PARAMETER	PT 11/18/03	PT 11/17/04	PT 11/16/05	PT 11/15/06	DECISION CRITERIA PEQ_{avg}	PEQ_{max}
Antimony	<10	<10	<10	10	24	33
Mercury	0.2	0.7	<0.2	<0.2	0.0085	0.0126
Nickel	<10	<10	16	<10	17	25
Selenium	18	13	<10	<10	17.5	24
Zinc	27	23	37	14	25	32
Cyanide, T.	70	70	60	50		

Table 4. Effluent Characterization and Decision Criteria

Summary of current permit limits and unaltered monthly operating report (MOR) data for the Warren WPCC outfall 001. All values are based on annual records unless otherwise indicated. N = Number of Analyses. * = For pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile; A = 7 day average. Decision Criteria: PEQ_{avg} = monthly average; PEQ_{max} = daily maximum analytical results.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50^{th}	95^{th}		# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Water Temperature	Annual	C	Monitor		1826	16	20	10-22			
Dissolved Oxygen	Summer	mg/l	5.0 min.		878	7.6	10	5-11.6			
Dissolved Oxygen	Winter	mg/l	5.0 min.		870	7.9	11.2	5-12.8			
Chemical Oxygen Demand (Low Level)	Annual	mg/l	Monitor		137	27	52.2	0-75			
pH, Maximum	Annual	S.U.	--	9.0	212	7	7.2	6.8-7.5			
pH, Maximum	Annual	S.U.	--	9.0	1614	7.3	7.8	6.6-8.4			
pH, Minimum	Annual	S.U.	--	6.5	212	6.9	7.1	6.5-7.5			
pH, Minimum	Annual	S.U.	--	6.5	1613	7.2	7.6	6.5-8.2			
Total Suspended Solids	Annual	mg/l	20	30^{A}	1242	3	13	1-48			
Oil and Grease, Total	Annual	mg/l	--	10	228	0.6	1.5	0-4.3			
Oil and Grease, Freon Extr-Grav Method	Annual	mg/l	--	--	30	0.85	2.29	0-2.9			
Nitrogen, Ammonia (NH3)	Summer	mg/l	3.0	4.5^{A}	634	0.37	2.2	0-5.5	424	2.41	3.30
Nitrogen, Ammonia (NH3)	Winter	mg/l	15	22^{A}	609	0.52	7.72	0-12	302	6.13	8.40
Nitrogen Kjeldahl, Total	Annual	mg/l	Monitor		239	4	10.5	0.62-15.4			
Nitrite Plus Nitrate, Total	Annual	mg/l	Monitor		245	8.7	13.5	0.91-16.4	245	8.38	11.48
Phosphorus, Total (P)	Annual	mg/l	Monitor		230	0.675	1.23	0.14-2.1	230	1.05	1.43
Cyanide, Free	Annual	mg/l	Monitor		120	0	0.0205	0-0.06	136	0.022	0.024
Cyanide, Free	Annual	mg/l	Monitor		16	0	0.0125	0-0.014	136	0.022	0.024
Selenium, Total Recoverable	Annual	ug/l	26	--	123	7.6	23	0-30	123	17.5	24
Thallium, Total Recoverable	Annual	ug/l	4.3	160	2	0	0	0-0	123	2.3	3.2
Thallium, Total (TL)	Annual	ug/l	4.3	160	121	0	0	0-4	123	2.3	3.2
Nickel, Total Recoverable	Annual	ug/l	Monitor		16	0	14.3	0-21	136	17	25
Nickel, Total Recoverable	Annual	ug/l	Monitor		120	0	21.1	0-61	136	17	25
Zinc, Total Recoverable	Annual	ug/l	Monitor		137	17	29	9-42	137	25	32

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50^{th}	95^{th}		# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Antimony, Total Recoverable	Annual	ug/l	Monitor		2	0	0	0-0	54	24	33
Antimony, Total	Annual	ug/l	Monitor		52	0	21	0-45	54	24	33
Cadmium, Total Recoverable	Annual	ug/l	Monitor		16	0.75	1.5	0-1.5	137	1.4	2.1
Cadmium, Total Recoverable	Annual	ug/l	Monitor		121	0.5	1.5	0-3	137	1.4	2.1
Lead, Total Recoverable	Annual	ug/l	Monitor		16	0	2.9	0-2.9	135	7.0	9.6
Lead, Total Recoverable	Annual	ug/l	Monitor		119	0	0	0-12	135	7.0	9.6
Chromium, Total Recoverable	Annual	ug/l	Monitor		138	0	0	0-7	138	4.1	5.6
Copper, Total Recoverable	Annual	ug/l	Monitor		16	0	0	0-0	138	6.8	10
Copper, Total Recoverable	Annual	ug/l	Monitor		122	0	10	0-14	138	6.8	10
Chromium, Dissolved Hexavalent	Annual	ug/l	Monitor		71	0	1	0-3	71	2.2	3
Fecal Coliform	Annual	#/100 ml	1000	2000^A	405	80	1040	1-2100			
Bis(2-ethylhexyl) Phthalate	Annual	ug/l	--	--	2	0	0	0-0			
Flow Rate	Annual	MGD	Monitor		1826	12.9	26.7	3.9-53.4			
Chlorine, Total Residual	Annual	mg/l	--	0.028	592	0.02	0.03	0-0.03	592	0.013	0.018
Mercury, Total	Annual	ug/l	--	--	16	0	0	0-0			
Mercury, Total (Low Level)	Annual	ng/l	Monitor		53	4.24	9.74	0-27.7	53	8.5	12.6
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	Monitor		4	0	0	0-0			
Chronic Toxicity, Ceriodaphnia dubia	Annual	TUc	Monitor		4	0	0	0-0			
Acute Toxicity, Pimephales promelas	Annual	TUa	Monitor		4	0	0.17	0-0.2			
Chronic Toxicity, Pimephales promelas	Annual	TUc	Monitor		4	0	0	0-0			
CBOD 5 day	Summer	mg/l	12	18^A	636	3	6	1-10			
CBOD 5 day	Winter	mg/l	12	18^A	610	3	7	1-12			

*** - 7 day concentration

Table 5. Effluent Data for Warren WPCC

Parameter	Units		# of Samples	# > MDL	Average PEQ	Maximum PEQ
Self-Monitoring (SWIMS) Data						
Ammonia	mg/L	Summer	424	354	2.409	3.30
Ammonia	mg/L	Winter	302	281	6.132	8.40
Nitrate+Nitrite	mg/L		245	245	8.38	11.48
Phosphorus	mg/L		230	230	1.052	1.429
Cyanide, free	µg/L		136	22	22.49	23.855
Selenium	µg/L		123	64	17.52	24.0
Thallium	µg/L		123	1	2.336	3.2
Nickel	µg/L		136	52	16.982	24.988
Zinc	µg/L		137	137	24.787	31.644
Antimony	µg/L		54	5	23.567	32.896
Cadmium	µg/L		137	72	1.411	2.144
Lead	µg/L		135	8	7.01	9.6
Chromium, tot.	µg/L		138	1	4.088	5.6
Copper	µg/L		138	13	6.753	10.089
Chromium $^{+6}$, diss.	µg/L		71	4	2.19	3.0
Bis(2-ethylhexyl)phthalate [A]	µg/L		2	0	--	--
TRC	µg/L		592	321	13.14	18.0
Mercury	µg/L		53	51	0.0085	0.0126
Pretreament Program						
Cyanide, total	µg/L		3	3	0.153	0.21

[A] Carcinogen

Table 6. Water Quality Criteria Used in the CONSWLA Model

Parameter	Units	Outside Mixing Zone Criteria: Average Human Health	Outside Mixing Zone Criteria: Average Agri-culture	Outside Mixing Zone Criteria: Average Aquatic Life	Outside Mixing Zone Criteria: Maximum Aquatic Life	Inside Mixing Zone Maximum
Antimony	µg/L	14.[C]	–	190.	900.	1800.
Arsenic	µg/L	50.[C]	100.	150.	340.	680.
Bis(2-Ethylhexl)Phthalate	µg/L	1.8 [C]	–	8.4	1100.	2100.
Barium	µg/L	2400.[C]	–	220.	2000.	4000.
Boron	µg/L	3100.[C]	–	950.	8500.	17000.
Bromomethane	µg/L	48.[C]	–	16.	38.	75.
Bromodichloromethane	µg/L	460.	–	–	–	–
Butylbenzyl phthalate	µg/L	300.[C]	–	23.	130.	260.
Chlorine, tot. res.	µg/L	–	–	11.	19.	38.
Chloroform	µg/L	5.7 [C]	–	140.	1300.	2600.
Chromium $^{+6}$, diss.	µg/L	–	–	10.[C]	16.	31.
Cobalt	µg/L	–	–	24.	220.	440.
Cyanide, free	mg/L	700.[C]	–	5.2 [C]	22.[C]	92.
1,4-Dichlorobenzene	µg/L	2600.	–	9.4	57.	110.
Dichloromethane	µg/L	16000.	–	1900.	11000.	22000.
Di-n-butyl phthalate	µg/L	2700.[C]	–	21.[C]	110.[C]	–
Fluoride	µg/L	–	2000.	–	–	–
Iron	µg/L	–	5000.	–	–	–
Mercury [A]	µg/L	0.012	10.	0.91	1.7	3.4
Molybdenum	µg/L	–	–	20000.	190000.	370000.
Naphthalene	µg/L	–	–	21.	170.	340.
Nitrate+Nitrite	mg/L	–	100.	–	–	–
Phenol	µg/L	21000.[C]	–	400.	4700.	9400.

[A] Bioaccumulative Chemical of Concern (BCC)
[C] Pennsylvania Water Quality Criteria.

Table 6. Water Quality Criteria in the Study Area - Continued.

		Outside Mixing Zone Criteria				
		Average				
Parameter	Units	Human Health	Agri- culture	Aquatic Life	Inside Maximum Aquatic Life	Mixing Zone Maximum
Selenium	µg/L	11000.	50.	5.0	–	–
Silver (Seg. 1)	µg/L	–	–	1.3	9.4[E]	51.[E,F]
Silver (Seg. 2)	µg/L	–	–	1.3	25[E,F]	75.[E,F]
Silver (Seg. 3)	µg/L	–	–	1.3	23.[E,F]	110.[E,F]
Silver (Seg. 4)	µg/L	–	–	1.3	22.[E,F]	55.[E,F]
Silver (Seg. 6)	µg/L	–	–	1.3	22.[E,F]	37.[E,F]
Silver (Seg. 9)	µg/L	–	–	1.3	23.[E,F]	51.[E,F]
Strontium	µg/L	–	–	5300.	48000.	95000.
Thallium	µg/L	1.7[C]	–	13.[C]	65.[C]	160.
Total Dissolved Solids	mg/L	–	–	1500.	–	–
Toluene	µg/L	6800.[C]	–	62.	560.	1100.

[C] Pennsylvania Water Quality Criteria.

[E] Local river hardness at critical low design flow was used to determine the water quality criteria. Segment 1 is at the Ohio Pennsylania state line (RM 11.43, hardness = 179 mg/L), Segment 2 is from the Orion Power Intake to the Ohio Pennsylania state line (RM 29.7 - RM11.43, hardness - 177 mg/L), Segment 3 is the WCI Intake to the Orion Power Intake (RM 36.5 to Rm 29.7, hardness = 168 mg/L), Segment 4 is from Leavittsburg to the WCI Intake (RM 45.5 to RM 36.5, hardness = 165 mg/L), Segment 6 is an unnamed tributary to the Mahoning that Mittal discharges to (hardness = 165 mg/L), and Segment 9 is Little Squaw Creek (hardness = 171 mg/L).

[F] Effective Criteria Based on Application of Dissolved Metal Translator.

Table 7. Instream Conditions and Discharger Flow for CONSWLA Model

Parameter	Units/Outfall		Value	Basis
Mahoning River Upstream				
7Q10	cfs	annual	135	USGS gage #03094000, 1969-06 data
1Q10	cfs	annual	127	USGS gage #03094000, 1969-06 data
30Q10	cfs	summer	178	USGS gage #03094000, 1969-06 data
	cfs	winter	191	USGS gage #03094000, 1969-06 data
HMQ	cfs	annual	379	USGS gage #03094000, 1969-06 data
Meander Creek at mouth				
7Q10	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
1Q10	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
30Q10	cfs	summer	6.19	USGS gage #03097500, 1929-51 data
	cfs	winter	6.19	USGS gage #03097500, 1929-51 data
HMQ	cfs	annual	6.19	USGS gage #03097500, 1929-51 data
Mosquito Creek at mouth				
7Q10	cfs	annual	10.6	USGS gage #03095500, 1954-91 data
1Q10	cfs	annual	9.47	USGS gage #03095500, 1954-91 data
30Q10	cfs	summer	14.0	USGS gage #03095500, 1954-91 data
	cfs	winter	12.6	USGS gage #03095500, 1954-91 data
HMQ	cfs	annual	28.0	USGS gage #03095500, 1954-91 data
Mill Creek at mouth				
7Q10	cfs	annual	9.99	USGS gage #03098500, 1952-71 data
1Q10	cfs	annual	9.87	USGS gage #03098500, 1952-71 data
30Q10	cfs	summer	10.7	USGS gage #03098500, 1952-71 data
	cfs	winter	15.7	USGS gage #03098500, 1952-71 data
HMQ	cfs	annual	14.3	USGS gage #03098500, 1952-71 data
Discharger Flow	cfs			
CSC Industries	005		2.17	NEDO
Thomas Steel Strip	001		2.79	NEDO
Warren Consolidated	007		3.84	NEDO
Industries	008		9.78	NEDO
	010		0.71	NEDO
	011		0.99	NEDO
	012		0.248	NEDO
	013		53.38	NEDO
	015		1.72	NEDO
	016		1.81	NEDO
ISG Steel	014		7.27	NEDO
Warren WPCC	001		24.8	NEDO
Reactive Metals, Inc.	001		0.696	NEDO
Niles WPCC	001		9.59	NEDO
McDonald Steel	001		1.45	NEDO

Table 7. Instream Conditions and Discharger Flow for CONSWLA Model - Continued.

Parameter	Units/Outfall		Value	Basis
Discharger Flow	cfs			
Mosquito Creek WPCC	001		6.5	NEDO
Meander Creek WPCC	001		6.19	NEDO
Boardman WPCC	001		7.74	NEDO
Orion Power	001		298.6	NEDO
	002		6.19	NEDO
	008		0.002	NEDO
Girard WPCC	001		7.74	NEDO
Youngstown WPCC	001		54.2	NEDO
Campbell WPCC	001		2.94	NEDO
Struthers WPCC	001		9.28	NEDO
Lowellville WPCC	001		0.792	NEDO
Mixing Assumption	%	average	100	Stream-to-discharge ratio
	%	maximum	100	Stream-to-discharge ratio
Instream Temperature	°C	summer	22	STORET [C]; 38 values, 0<MDL, 1990-98
		winter	4.1	STORET [C]; 27 values, 0<MDL, 1990-98
Instream pH	S.U.	summer	7.8	STORET [C]; 38 values, 0<MDL, 1990-98
		winter	7.9	STORET [C]; 27 values, 0<MDL, 1990-98
Background Water Quality				
Ammonia	mg/L	summer	0.09	STORET; 42 values, 8<MDL, 1999-2005
		winter	0.13	STORET; 16 values, 0 <MDL, 1999-2005
Arsenic	µg/L	annual	2.0	STORET; 124 values, 54<MDL, 1999-2005
Antimony	µg/L	annual	0.0	No representative data available
Barium	µg/L	annual	36.	STORET; 124 values, 0<MDL, 1999-2005
Boron	µg/L	annual	0.	No representative data available
Bis(2E)Phthalate	µg/L	annual	0.	No representative data available
Butylbenzyl phthalate	µg/L	annual	0.	No representative data available
Cadmium	µg/L	annual	0.	STORET [C]; 82 values, 82<MDL, 1999-2006
Chlorine, total res	µg/L	annual	0.	No representative data available
Chromium, tot.	µg/L	annual	0.	STORET [C]; 82 values, 81<MDL, 1999-2006
$Chromium^{+6}$, diss	µg/L	annual	0.	No representative data available
Chloroform	µg/L	annual	0.	No representative data available
Copper	µg/L	annual	0.	STORET [C]; 82 values, 81<MDL, 1999-2006
Cyanide free	µg/L	annual	0.	No representative data available
Fluoride	µg/L	annual	0.	No representative data available
Iron	µg/L	annual	747.	STORET; 124 values, 0<MDL, 1999-2005
Lead	µg/L	annual	1.24	STORET [C]; 82 values, 70<MDL, 1999-2006
Mercury	µg/L	annual	0.	No representative data available
Molybdenum	µg/L	annual	0.	No representative data available

Table 7. Instream Conditions and Discharger Flow for CONSWLA Model - Continued

Parameter	Units/Outfall		Value	Basis
Background Water Quality (Cont.)				
Naphthalene	µg/L	annual	0.	No representative data available
Nickel	µg/L	annual	0.	STORET [C]; 82 values, 82<MDL, 1999-2006
Phenol	µg/L	annual	0.	No representative data available
Selenium	µg/L	annual	0.	STORET; 15 values, 15<MDL,
Silver	µg/L	annual	0.	No representative data available
Strontium	µg/L	annual	151.	STORET; 124 values, 0<MDL, 1999-2005
Thallium	µg/L	annual	0.	No representative data available
Toluene	µg/L	annual	0.	No representative data available
TDS	mg/L	annual	307.	STORET; 109 values, 0<MDL, 1999-2005
Zinc	µg/L	annual	8.97	STORET [C]; 82 values, 55<MDL, 1999-2006

[C] STORET station # 602280 Mahoning River @ Leavittsburg - Leavitt Rd. RM 45.51

Table 8. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

		Average			Maximum	Inside
Parameter	Units	Human Health	Agri Supply	Aquatic Life	Aquatic Life	Mixing Zone Maximum
Antimony [B]	µg/L	684.[E]	–	977.	4435.[A]	1800.
Arsenic [B]	µg/L	811.[A E]	1653.[A]	1040.[A]	2263.[A]	680.
Cadmium	µg/L	--	--	2.3 [E]	19.[A]	19.
Chlorine, total res summer	µg/L	–	–	16.	28.	38.
Chromium, tot. [B]	µg/L	--	--	688.	6100.[A]	6100.
Chromium^{+6}, dissolved [B]	µg/L	–	–	60.[A E]	83.[A]	31.
Copper	µg/L	--	--	40.[D]	50.[D]	51.
Cyanide free	µg/L	700.[A E]	–	24.[E]	86.[E]	92.
Lead	µg/L	--	--	19.[D, E]	354.[D]	550.
Mercury [C]	µg/L	0.049	41.[A]	1.6	2.9	3.4
Molybdenum [B]	µg/L	--	--	140200.	1271000.[A]	370000.
Nickel [B]	µg/L	--	--	406.	1600.[A]	1600.
Selenium	µg/L	119000.	541.	24.	–	–
Silver [B]	µg/L	--	--	5.5	92.[A]	55.
Thallium	µg/L	84.[E]	--	102.[E]	453.[A E]	160.
Zinc [B]	µg/L	--	--	410.	346.	410.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.
[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested for use in pretreatment program.
[C] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe - unless the requirements for an exception are met as listed in 3745-2-08.
[D] WLA based on applicable dissolved metal translator.
[E] Pennsylvania water quality criteria was applied

Table 9. Parameter Assessment

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Cyanide, total	Phosphorus

Group 2: PEQ < 25% of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional.

Antimony	Arsenic	Bis(2-Ethylhexl)Phthalate
Chromium^{+6}, diss.	Chromium, tot.	Molybdenum
Nickel	Nitrate+Nitrite-N	Silver
Zinc		

Group 3: PEQ_{max} < 50% of maximum PEL and PEQ_{avg} < 50% of average PEL. No limit recommended, monitoring optional.

Copper	Mercury (<11/15/2010)	Lead
Thallium		

Group 4: $PEQ_{max} \geq$ 50% but <100% of the maximum PEL or $PEQ_{avg} \geq$ 50% but < 100% of the average PEL. Monitoring is appropriate.

Cadmium	Chlorine, total res	Mercury (>11/15/2010)
Selenium		

Group 5: Maximum PEQ $\geq$ 100% of the maximum PEL or average PEQ $\geq$ 100% of the average PEL, or either the average or maximum PEQ is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits Average	Maximum
Cyanide, free	µg/L	annual	24.	86.

Table 10. Final effluent limits and monitoring requirements for the Warren WPCC outfall 3PE00008001 and the basis for their recommendation.

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
		30 Day	Daily	30 Day	Daily	
Parameter	Units	Average	Maximum	Average	Maximum	Basis[b]
Water Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Suspended Solids	mg/l	20	30[d]	1211	1817	PD\EP
Oil and Grease	mg/l	--	10	--	--	WQS
Ammonia-N	mg/l					
Summer		3.0	4.5[d]	182	273	WLA\EP\PD
Winter		15	22[d]	908	1332	WLA\EP\PD
Fecal Coliform	#/100ml					
(Summer only)		1000	2000[d]	–	–	WQS
Flow	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
$CBOD_5$	mg/l	12	18[d]	727	1090	PD\EP
pH	S.U.	- - - - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - -				WQS
Chlorine Residual	mg/l	--	0.028	--	--	ABS/EP
Dissolved Oxygen	mg/l	not less than 5.0				WQS\PD
Phosphorus	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Nitrogen, Total						
Kjeldahl	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Selenium, T. R.	ug/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Zinc, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M
Chromium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Hex. Chromium						
(Dissolved)	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Nickel, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Lead, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Copper, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Cadmium, T. R.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Mercury, T.	ng/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M/RP[c]
Cyanide, Free	mg/l	0.024	0.086	1.45	5.21	WLA
NO2+NO3-N	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
COD	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Whole Effluent						
Toxicity						
Acute	TUa	- - - - - - - - Monitor (w/o trigger) - - - - - - - - - -				M[c]
Chronic	TUc	- - - - - - - - Monitor (w/o trigger) - - - - - - - - - -				M[c]

Table 10. Con't.

---

[a] **Any effluent loading limits for the following parameters are calculated using the Monte Carlo flow: Cadmium, Chromium (total), Copper, Lead, Nickel, and Zinc, and all the other parameters that need effluent loading limits are calculated using the CONSWLA flow. This is because of OAC 3745-33-07 (C) (1)(b). For this particular fact sheet** the CONSWLA flow (of 24.8 (cfs) or 16.0 (MGD)) was used to calculate the effluent loading limitations of the Suspended Solids, Ammonia-N (summer), Ammonia-N (winter), $CBOD_5$, Chlorine residual, Cyanide, Selenium and Thallium.

[b] Definitions: ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l)); AD = Antidegradation (OAC 3745-1-05); BPJ = Best Professional Judgment; BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 133, Secondary Treatment Regulation; EP = Existing Permit; M = Monitoring; PD = Plant Design Criteria; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ; WLA = Wasteload Allocation procedures (OAC 3745-2); WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum; WQS = Ohio Water Quality Standards (OAC 3745-1).

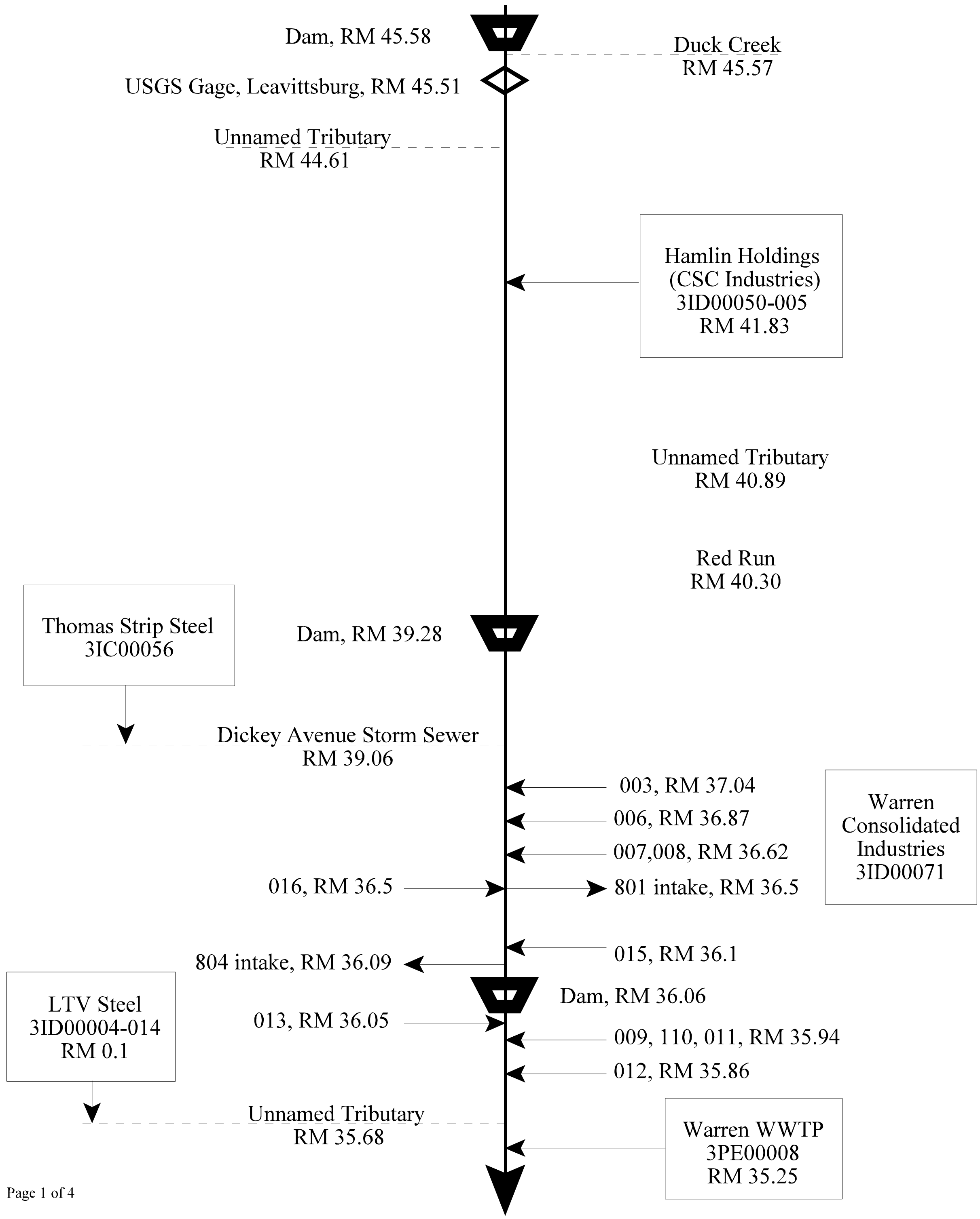
[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

[d] 7 day average limit.

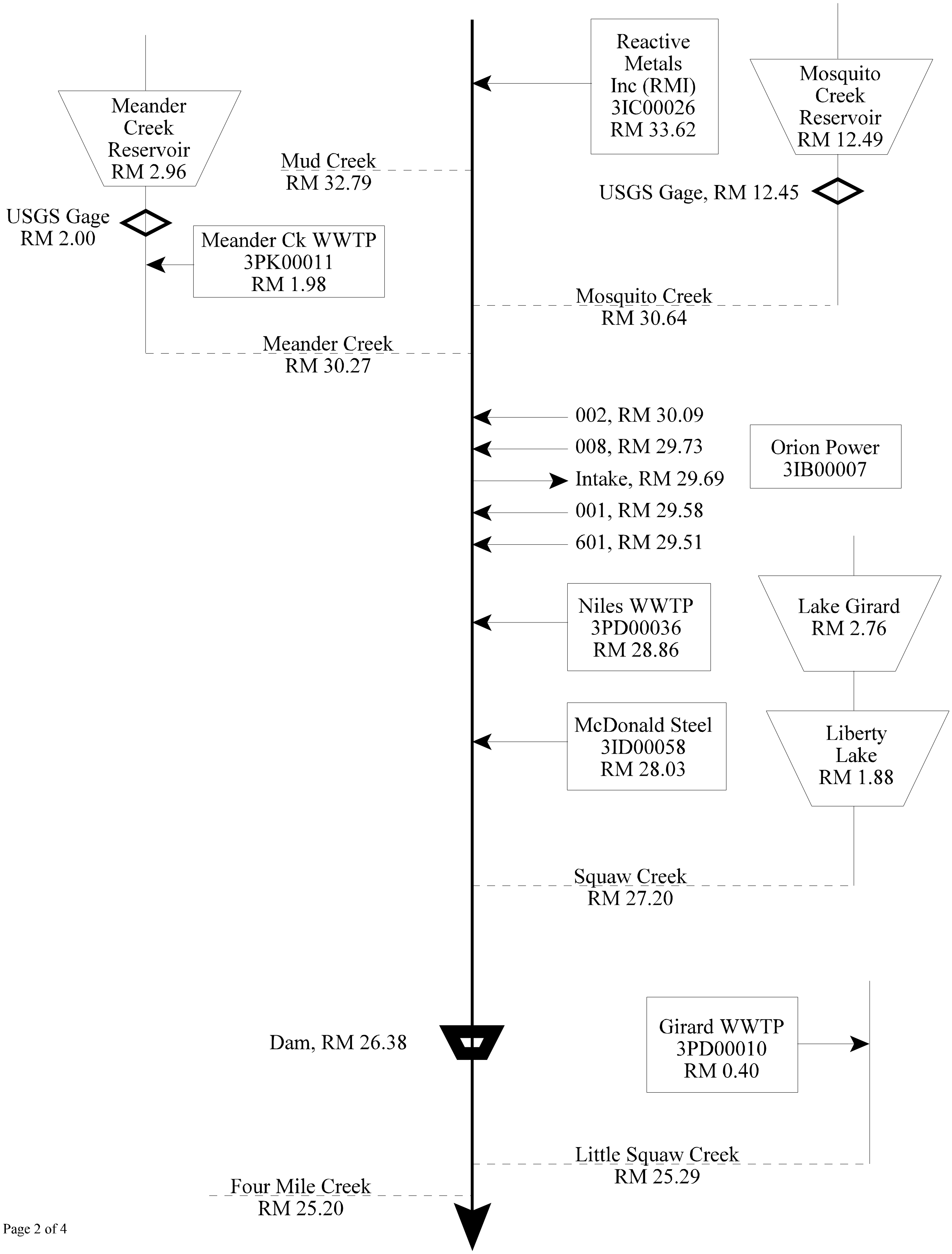
Figure 1. Approximate location of the Warren WPCC.

Mahoning River

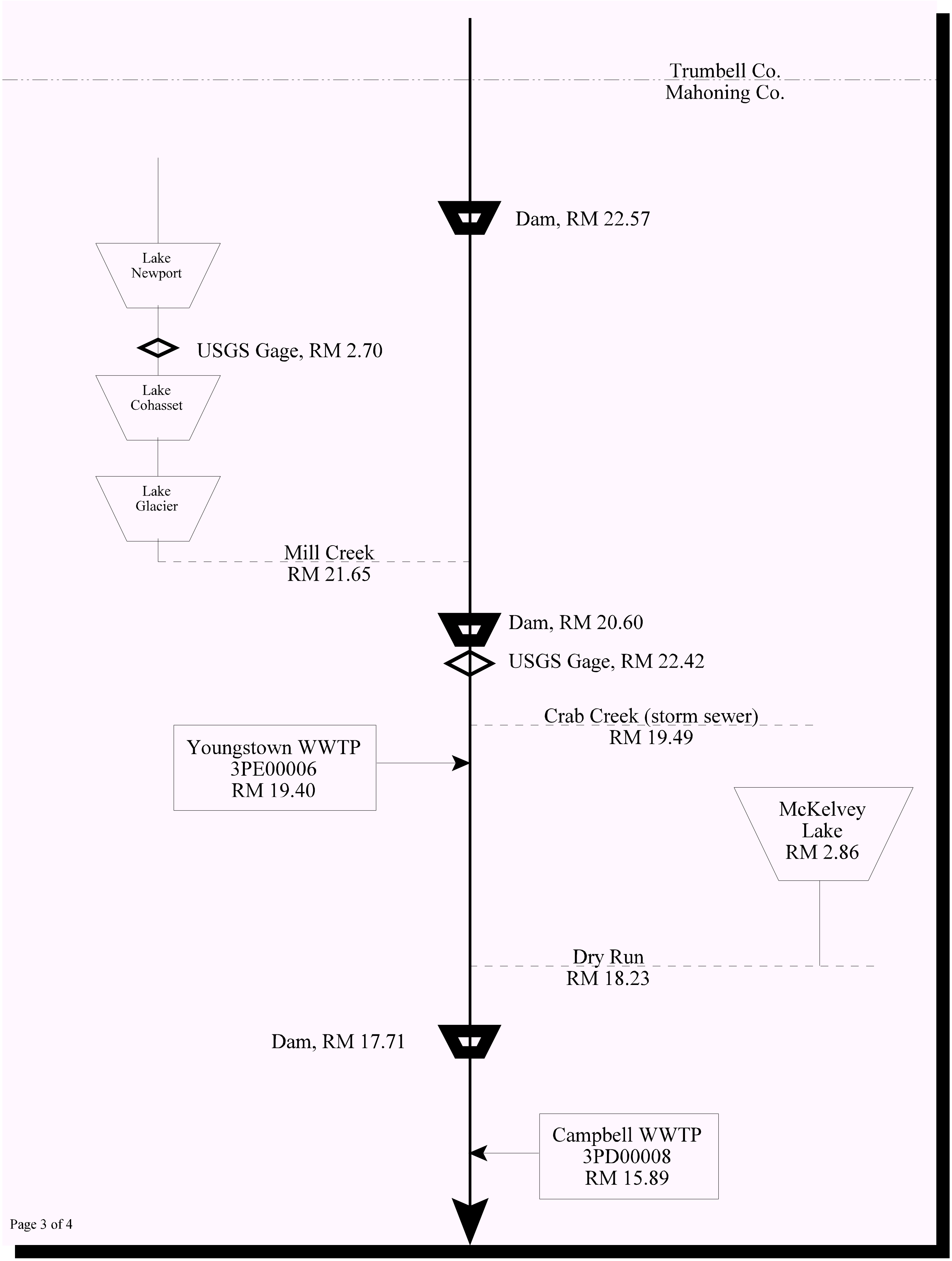
From Leavittsburg USGS Gage
to the Mouth

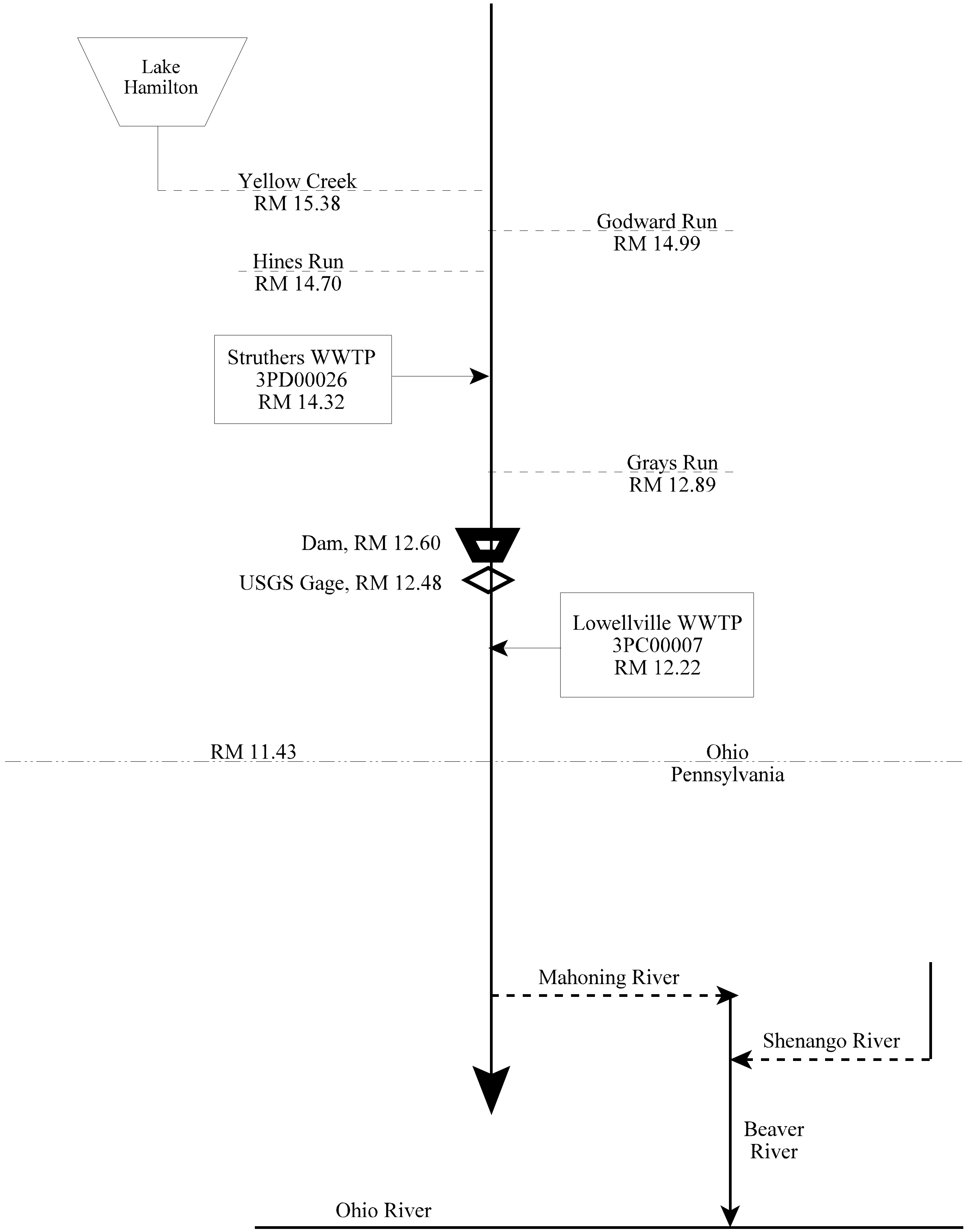


Page 1 of 4


Reactive Metals Inc (RMI) 3IC00026 RM 33.62
Mosquito Creek Reservoir RM 12.49
Meander Creek Reservoir RM 2.96
Mud Creek RM 32.79
USGS Gage, RM 12.45
USGS Gage RM 2.00
Meander Ck WWTP 3PK00011 RM 1.98
Mosquito Creek RM 30.64
Meander Creek RM 30.27
002, RM 30.09
008, RM 29.73
Intake, RM 29.69
001, RM 29.58
601, RM 29.51
Orion Power 3IB00007
Niles WWTP 3PD00036 RM 28.86
Lake Girard RM 2.76
McDonald Steel 3ID00058 RM 28.03
Liberty Lake RM 1.88
Squaw Creek RM 27.20
Girard WWTP 3PD00010 RM 0.40
Dam, RM 26.38
Little Squaw Creek RM 25.29
Four Mile Creek RM 25.20

Page 2 of 4


Trumbell Co.
Mahoning Co.
Dam, RM 22.57
Lake Newport
USGS Gage, RM 2.70
Lake Cohasset
Lake Glacier
Mill Creek
RM 21.65
Dam, RM 20.60
USGS Gage, RM 22.42
Crab Creek (storm sewer)
RM 19.49
Youngstown WWTP
3PE00006
RM 19.40
McKelvey Lake
RM 2.86
Dry Run
RM 18.23
Dam, RM 17.71
Campbell WWTP
3PD00008
RM 15.89
Page 3 of 4


Lake
Hamilton
Yellow Creek
RM 15.38
Godward Run
RM 14.99
Hines Run
RM 14.70
Struthers WWTP
3PD00026
RM 14.32
Grays Run
RM 12.89
Dam, RM 12.60
USGS Gage, RM 12.48
Lowellville WWTP
3PC00007
RM 12.22
RM 11.43
Ohio
Pennsylvania
Mahoning River
Shenango River
Beaver
River
Ohio River

Page 4 of 4